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Study of magnetically active sorbents surface morphology using scanning electronic microscopy

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Over recent years nanodisperse powders synthesis and investigation of their properties, as well as production of different materials on their basis, is the leading direction in material science. Modification of polymers using disperse nanoparticles in the process of composites production gives possibility to produce new constructional materials with the improved performance characteristics. Nowadays magnetic nanomaterials are of great interest due to their unique magnetic characteristics and combination of unusual physical properties of nanoparticles, which enables us to use them in the magnetically active sorbents in water reclamation technologies. Nanoparticles surface modification using polymer materials with high sorption capacity can become an important tool to manage magnetic properties in nanostructures. Humic acids are counted among the promising polymers in nanotechnology and they are already used in the technology of natural and waste water treatment [1].

We used humic acid with further modification by magnetic fluid in the process of magnetically active sorbent synthesis [2], we have studied their structural properties with the help of the scanning probe microscope (SPM) JSPM-5400 made by JEOL (Japan)(Fig. 1).

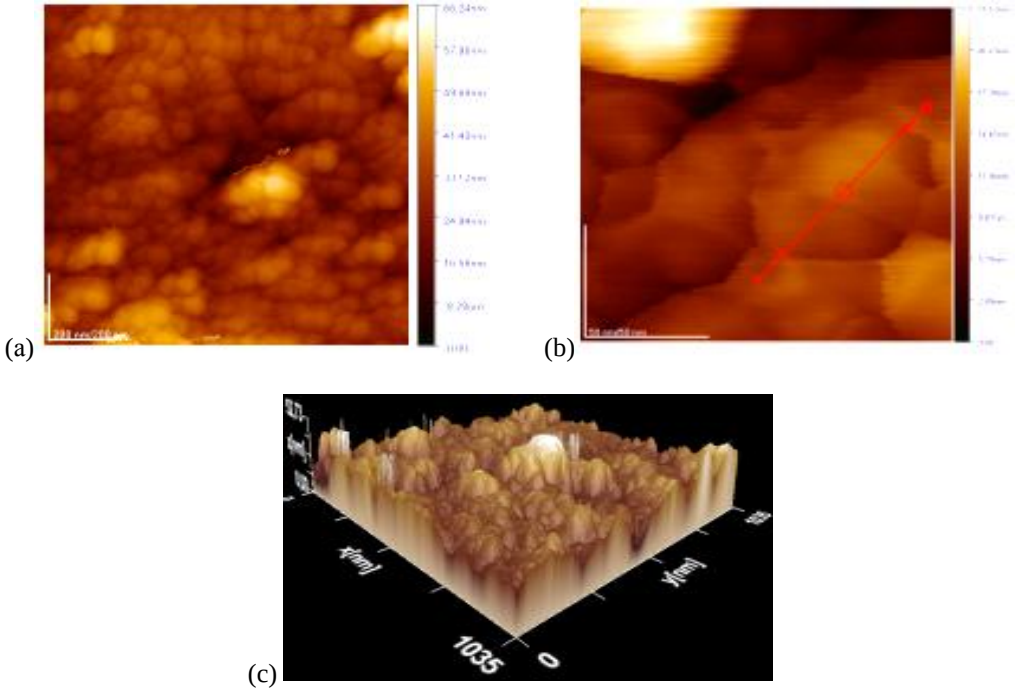

Figure 1. SPM pictures of magnetically active sorbents surface on the basis of humic acid: (a) 1000×1000 nm; (b) 151×151 nm; (c) quasi 3D image.

Electron microscopy study showed that particles have shape that is close to spherical, they have narrow size distribution and are present both as individual particles and as aggregates. Nanosized particles are distributed in the matrix homogeneously enough, medium diameter of a particle is 75,7 nm, height is 11,79-13,04 nm.

1. A.Yu Polyakov, A.E. Goldt, T.A. Sorkina, I.V. Perminova, D.A. Pankratov, E.A. Goodilin, Y.D. Tretyakov, *Cryst .Eng.Comm.* **14**, 8097 (2012).
2. A.Kh. Zhakina, Z.G. Akkulova, A.K. Amirkhanova, G.K. Kudaibergen, E.P. Vassilets. ISJ *Theoretical &Applied Science* **26**, 12 (2015).